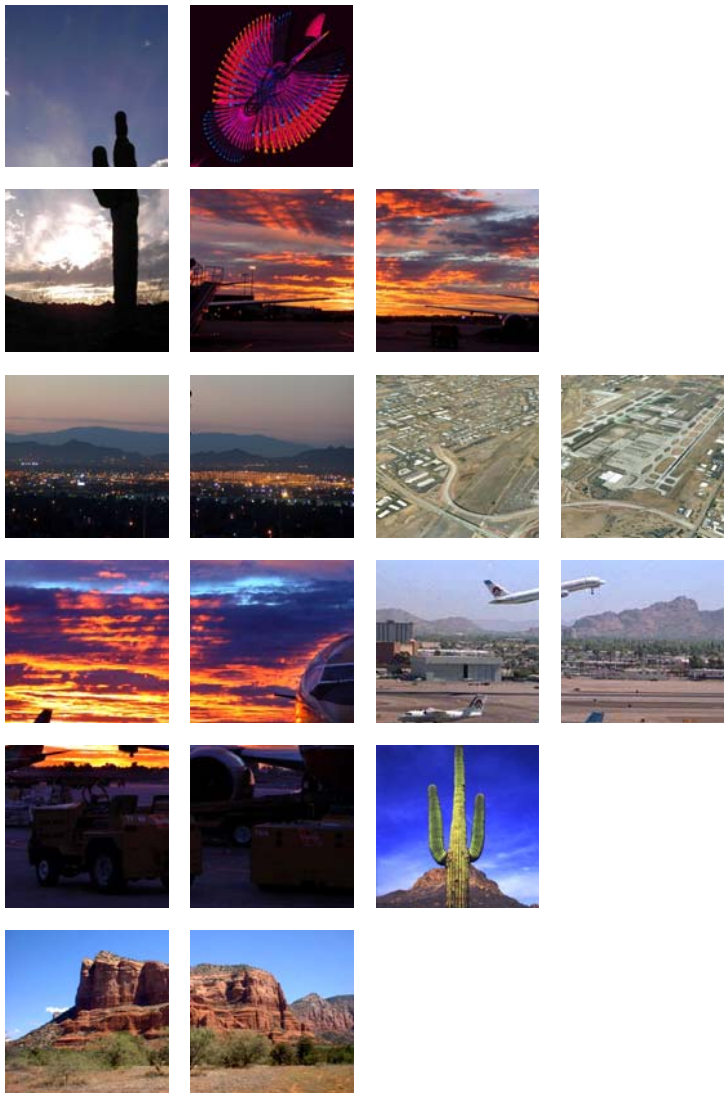


Section 7

Layout, Design, and Cost Estimate

Section 7 Layout, Design and Cost Estimate

Facility components required for fire training facilities are guided by both Federal Aviation Administration (FAA) Advisory Circular AC 150/5220-17A, *Design Standards for an Aircraft Rescue and Fire Fighting Training Facility*, and industry standards. Specific components will vary according to the training needs at each facility. The operational requirements are dictated by FAA Regulation FAR Part 139 which describes operation requirements for airports with commercial airline service.

As determined by the Planning Advisory Committee for this project and presented previously, the selected site for this facility is the Phoenix Fire Training Academy. The City of Phoenix is currently expanding its training capacity by building additional facilities south of its existing academy. These new facilities will include a driver training course, structural and specialized training props and buildings, and classroom and other academic facilities. The ARFF component is proposed to be an additional component of the overall facility and fulfills the selection criteria established by the committee for a multi-use facility.

7.1 Facility Layout

The proposed Phoenix Fire Training Academy layout is shown in Exhibit 7.01. The southwest quadrant of the planned development is dedicated to ARFF training and is further depicted in Exhibit 7.02. Development of the ARFF component will be based on FAR Index D requirements to meet the needs of the region's airports.

Some of the Index D parameters include the following:

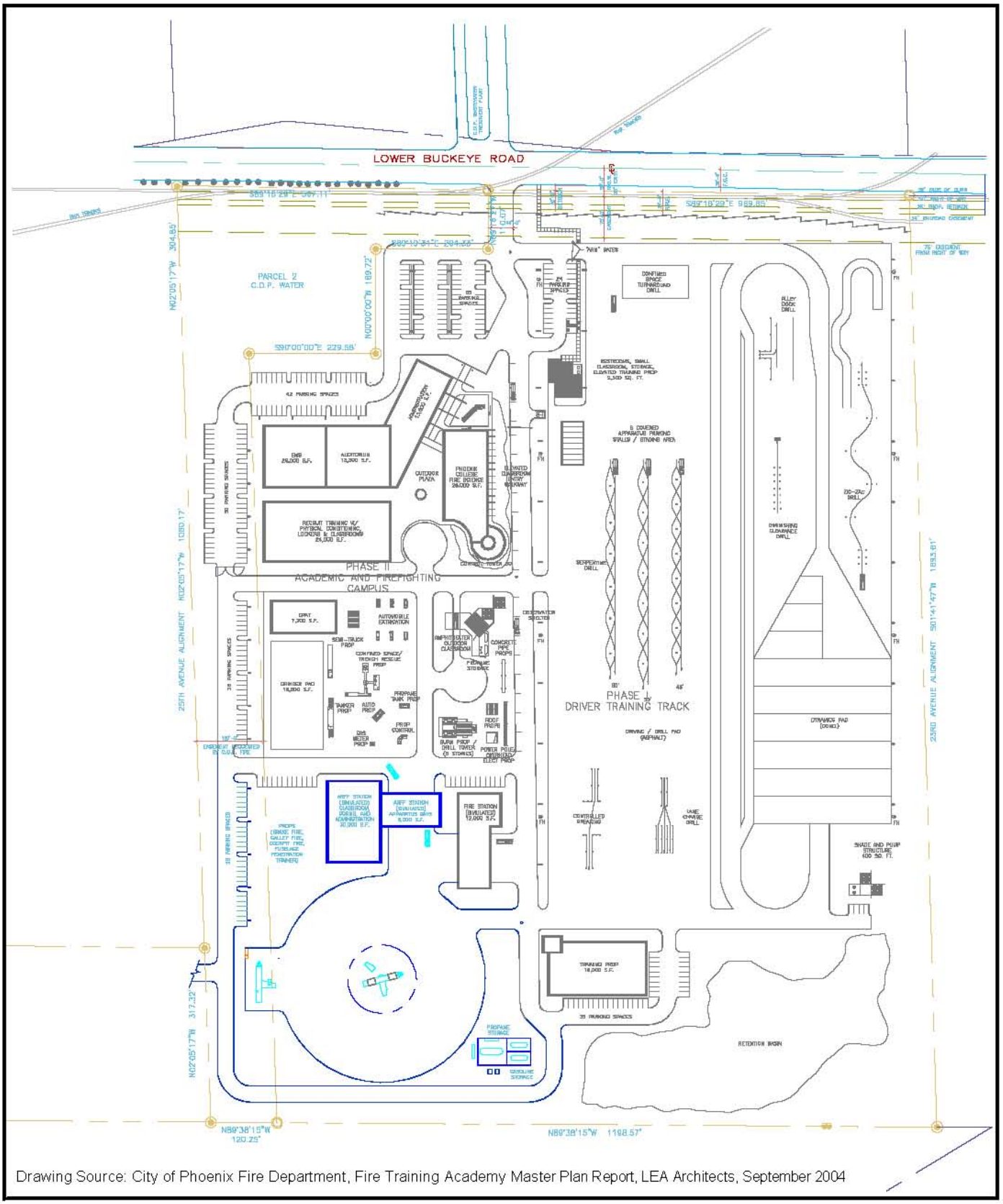
- Burn area of at least 12,271 square feet;
- Burn area diameter of 125 feet; and
- Three response vehicles with combined capacity for 4,000 gallons water/foam.

Training facility burn areas can be fueled in one of two manners, fossil fuel or propane. Because of the advantages of using propane fuel which includes efficiency, cleaner burning, environmental compatibility and less complex support equipment, a propane fueled facility is proposed.

The four components required for the proposed ARFF training facility are:

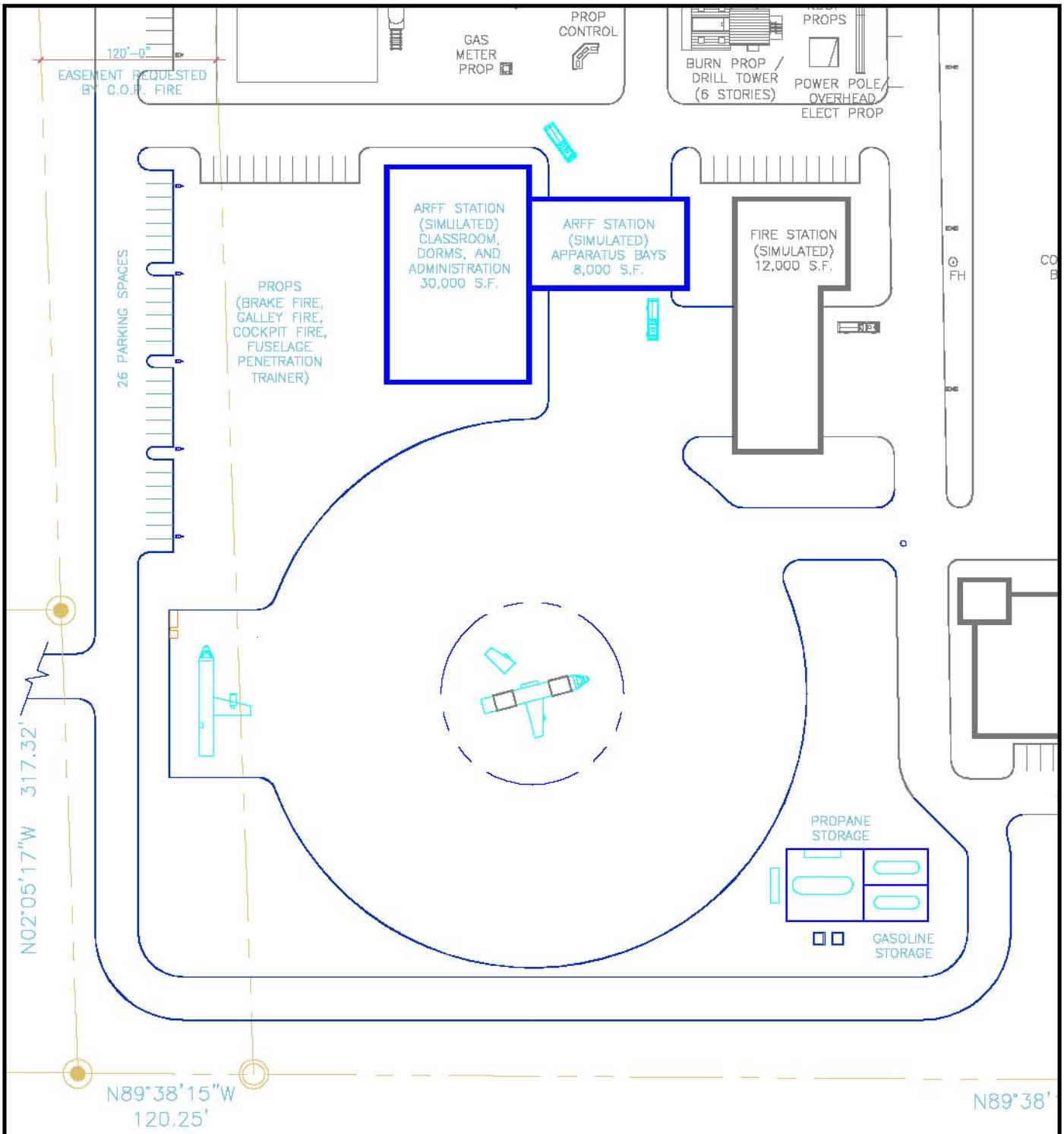
- Fuel Spill Trainer (FST);
- Specialized Aircraft Fire Trainer (SAFT);
- Propane Fuel Tank Farm; and
- Control Building.

In addition, site development and improvements and supporting utilities are required to transform the undeveloped site into a fully developed and working training facility. The trainer supplier can be expected to provide the FST, SAFT and propane farm. The sponsor will be required to develop the site with all necessary supporting infrastructure.



Drawing Source: City of Phoenix Fire Department, Fire Training Academy Master Plan Report, LEA Architects, September 2004

The **Louis Berger** Group, Inc. Phoenix, Arizona	City of Phoenix Fire Department Fire Training Academy Proposed Layout	EXHIBIT 7-1 PHOENIX, ARIZONA



Drawing Source: City of Phoenix Fire Department, Fire Training Academy Master Plan Report, LEA Architects, September 2004

The **Louis Berger** Group, Inc. Phoenix, Arizona	Regional ARFF Training Facility Proposed Layout	EXHIBIT 7-2 PHOENIX, ARIZONA

7.2 Facility Design

Each major component of the proposed facility which exceeds the minimum requirements is further described below:

7.2.1 Fuel Spill Trainer

The Fuel Spill Trainer (FST) is the focal point of the facility. It contains the primary burn area and is used to train and certify fire fighters in the control and extinguishment of large scale fuel spill fires. For the proposed Index D facility, the burn area covers at least 12,271 square feet with flame and the burn pit diameter is 125 feet. It will contain a Boeing 737 commercial airline mockup with broken wing that is 10 feet in diameter and 75 feet in length (mockup requires concrete support pedestal). For search and rescue training, the mockup is provided with bulkheads, seats and access doors. It can also be provided with the capability to simulate a three dimensional fuel line leak from a wing engine. The proposed fueling system is propane. The burn pit construction will include a concrete containment structure with gravel fill and drainage/collection system. A paved maneuvering will surround the burn pit to provide adequate space for the Index D ARFF vehicles to access the fire area.

7.2.2 Specialized Aircraft Fires Trainer

The Specialized Aircraft Fires Trainer (SAFT) is a valuable training aid that provides fire fighters with training in numerous and varied types of aircraft fires. It is located in a separate area on the periphery of the FST maneuvering area. It is also fueled by propane but because of its function, consumes far less fuel. It will also contain a Boeing 737 mockup (concrete support pedestal also required), but this mockup is configured for the specific fires selected for inclusion in the trainer.

To meet FAA criteria, the SAFT must include seven fire stations: Wing Engine Fire, Wheel/Brake Fire, Main Cabin Fire, Cockpit Fire, Baggage Fire, Galley Fire, and Lavatory Fire. In addition, the usefulness of the trainer can be enhanced by inclusion of six or more additional fire stations: Flashover in Main Cabin, Fire Extension in Main Cabin, Auxiliary Power Unit Fire, Tail Engine Fire, Electronics Bay Fire Effect and Cargo Fire.

7.2.3 Propane Storage Tank Farm

A clean burning, efficient propane fueling system is proposed to support both fire trainers. This system will require that a fuel tank farm be installed on the site which will include 30,000 gallons of propane storage and all related pumps and equipment (vaporizer, safety valves, loading stations, piping, etc.).

7.2.4 ARFF Training Building and Control Center

A key component of the fire trainer operation is the control center. This facility contains the computerized control system and components and a tower to provide unimpeded and clear surveillance of training operations at both trainers. The building that serves this function can be

expanded to provide for other training functions and such a facility is proposed for the Phoenix site. The proposed building may include the following components: tower and control room, classrooms, restrooms, dormitory, break room, utility room, administrative offices, shower/locker room, storage, briefing room, training room.

7.2.5 ARFF Vehicle Garage

ARFF training will require the use of sophisticated vehicles that meet FAA Index D requirements. The proposed garage will provide protected space for these vehicles and associated equipment. Four vehicle bays with drive through capability are anticipated in a facility with approximately 8,000 square feet of floor space.

7.2.6 ARFF Vehicles

It is anticipated that effective use of the trainers in meeting Index D requirements will require the purchase of a minimum of two ARFF vehicles, one with 3,000 gallon water capacity for foam production and the other with 1,500 gallon water/foam capacity.

7.2.7 Site Development

In addition to preliminary site grading to the desired grades, site development will require drainage, paving of access areas and parking lot, area lighting, curbs and sidewalks and landscaping.

7.2.8 Utilities

Support utilities must be brought to the site to result in a complete and functional facility. Utilities required include electric, telephone and communications, domestic water, sanitary sewer and compressed air.

7.3 Facility Cost Estimate

An order of magnitude cost estimate for the Regional ARFF Training Facility was developed using unit costs from many sources including previous cost estimates from the 1995 report, the Fire Training Academy Master Plan, R.S. Means Building Construction Cost Data, and information obtained from Kidde Fire Trainers, Inc. and Oshkosh Truck Corporation.

The cost estimate for the Phoenix site is shown in Table 7.01 below.

TABLE 7.01

CITY OF PHOENIX ARFF FIRE TRAINING FACILITY - PRELIMINARY COST ESTIMATE

Item	Quantity	Units	Unit Price	Cost ($)
ARFF Vehicle Garage	8,000	SF	$150.00	$1,200,000
ARFF Training Bldg	30,000	SF	$200.00	$6,000,000
Fuel Spill Trainer - 737 mockup	1	LS	$2,000,000.00	$2,000,000
Specialized Aircraft Fires Trainer - 737 mockup with 13 fires	1	LS	$2,350,000.00	$2,350,000
Propane Storage Tank Farm - 30,000 gal.	1	LS	$550,000.00	$550,000
Site Preparation	8	AC	$3,000.00	$24,000
Concrete Pads - 6"	28,300	SF	$3.00	$84,900
Concrete Footings	2	EA	$15,000.00	$30,000
Site Paving - Asphalt	138,000	SF	$2.00	$276,000
Drainage	1	LS	$100,000.00	$100,000
Area Lighting	6	EA	$2,000.00	$12,000
Landscaping	1	LS	$50,000.00	$50,000
Electric Service	1	LS	$75,000.00	$75,000
Telephone/Communications	1	LS	$50,000.00	$50,000
Domestic Water Service	1	LS	$100,000.00	$100,000
Sanitary Sewer	1	LS	$100,000.00	$100,000
Compressed Air	1	LS	$20,000.00	$20,000
SUB TOTAL				**$13,021,900**
Permitting 1%				$130,219
Design 10%				$1,302,190
Inspection 10%				$1,302,190
SUB TOTAL				**$2,734,599**
ARFF Vehicle - 1500 gal.	1	EA	$650,000.00	$650,000
ARFF Vehicle - 3000 gal.	1	EA	$750,000.00	$750,000
SUB TOTAL				**$1,400,000**
TOTAL				**$17,156,499**